5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NU28
Pima NU29

it grew beneath mesquite trees. This name was wholly unfamiliar to our Piman informants.

A third native species, *N. Bigelovii*, designated "Coyote tobacco," was reported by Russell as having been used by the Pima for smoking. In spite of considerable effort we have been unable to confirm the use of this species by the Pima, or even to ascertain that it grows in Arizona. Thornber[101] writes that he has heard it occurs in the state, but the herbarium of the University of Arizona contains no specimens of this species from Arizona. It was smoked to some extent by the Arizona Indians, but where they secured it has not been ascertained although its distribution would indicate they may have obtained it from the Indians of southern California, just as the Maricopa[102] got tobacco by trade from the Akwa'ala in Lower California.

Both Papago and Pima are known to have cultivated the common tobacco, *N. Tabacum* L., for a number of years, although it has been impossible to ascertain when or where they first obtained it. Emory,[103] who visited the Pima in 1846, and Bartlett, there in 1852, both mentioned Pima crops but neither made any reference to the cultivation of tobacco. However, Browne[104] wrote in 1874 of its being raised by the Pimas, who planted it when the mesquite trees began to leaf out. Also the Papago at San Xavier, as well as the Pima at Sacaton, are known to have been growing *N. Tabacum* in 1903;[105] and Lumholtz,[106] writing in 1912, referred to the Papago cultivating tobacco. Gray[107] says the "Yaqui tobacco" found cultivated in Arizona by Dr. Edward Palmer, and specimens of which were grown in the Botanic Garden of

101 J. J. Thornber, Personal correspondence, Feb. 13, 1940.
102 Spier, *loc. cit.*
103 Emory, *Notes;* Bartlett, *Narrative.*
104 Browne, *Adventures in the Apache Country*, p. 109.
105 Thornber, *loc. cit.;* Lloyd, *Aw-aw-tam Indian Nights*, p. 58.
106 Lumholtz, *New Trails*, p. 52.
107 Gray, *Synoptical Flora of North America*, II, pt. 1, 241; C. A. Weatherby, Senior Curator, Gray Herbarium, Harvard University, Personal correspondence, Feb. 26, 1940.

5: Castetter & Bell N-5 (1938-1940) 1942
NU28 Papago NU28
Pima NU29

Harvard University in 1871 from seed furnished by Palmer, probably belongs to *N. Tabacum* var. *undulata* Sendtner. Informants said the Papago had always raised tobacco, also that corn and tobacco are of equal age on the earth. However, one Papago informant, seventy-seven years of age, said that when he was a little boy his grandfather used to smoke "Coyote's tobacco" *(N. trigonophylla)*, but also had the common "Mexican tobacco" which they got from Mexico by trade for deer skins. It seems quite certain that *N. Tabacum*, north of Mexico at least, was unknown in aboriginal use.[108]

N. Tabacum, referred to by the Papago as "under-the-creosote-bush tobacco," is also spoken of as "real tobacco." It is reported as the only species cultivated, and informants said that in early days almost every family had a tobacco patch. A specimen was obtained from Bernabé López at San Pedro village under the name of "under-the-creosote-bush tobacco" and was identified by Goodspeed[109] as a pink-flowered variety of *N. Tabacum*.

Two seed samples secured from different informants were identified by Goodspeed as *N. rustica*. Informant Vanico had grown this species for many years and Manuel Lowe had grown it years ago; the latter said it was known as "Coyote's tobacco." Spier[110] reports that the Maricopa secured "real tobacco" from the Pima who cultivated it.

Leaves of the wild species of *Nicotiana*, whenever used by either tribe, were gathered, dried and stored, but generally not mixed with the cultivated tobacco. They preferred to smoke the cultivated tobacco, but when it was not available would smoke the wild species. However, when the supply of common tobacco was nearly exhausted it might be mixed with the wild species. For the most part the Pima, and to a

[108] Setchell, *op. cit.*, p. 401; T. H. Goodspeed, Professor of Botany, University of California, Personal correspondence, Jan. 30, 1940.
[109] Goodspeed, *loc. cit.*
[110] Spier, *loc. cit.*

5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NV28
Pima NU29

Pi Pa 249 276

lesser extent the Papago, now secure their tobacco from the whites and rarely grow it.

The Papago and Pima seldom smoked by itself any wild plant other than *Nicotiana*, nor did they usually mix any wild plant with tobacco to dilute it or to economize, for they liked it strong. However, a lichen known as "earth flowers," which grows on mountains in southern Arizona, was occasionally dried and a small amount mixed with the tobacco. We were unable to secure a specimen of this plant; the one secured by Underhill several years ago and seen by the authors was not in condition to make determination possible. It now seems certain from our investigations with both Papago and Pima informants that this is not the *pihol* flowers referred to by Densmore.[111] One professed to be acquainted with *piholt*, described as a desert plant which when in bloom smelled something like "earth flowers." The lichen used was described by our informants as having a strong sweet smell, being somewhat narcotic and of such magical properties that smoking a little of it mixed with tobacco would attract game while hunting. One informant said sometimes dried tepary leaves were mixed with tobacco, the smoker expressing a wish for a large crop of teparies next season.

Pi Pa 276 194

It has been impossible for us to determine the antiquity of tobacco smoking or cultivation among the Pima-Papago. The early documentary material is strangely silent as regards both its cultivation and smoking, although it makes frequent mention that these Indians were extremely glad to receive gifts of tobacco.[112] Moreover, archaeology throws no light on the problem among the Hohokam and Piman cultures. Pertinent to the situation along the middle Gila, however, are specimens from Casa Grande National Monument. In 1935 reed pipes from this site were sent for examination to the Ethnobiological Laboratory of the University of Michi-

111 Densmore, *Papago Music*, pp. 210-11.

112 Coues, *On the Trail*, I, 106, 109; Bolton, *Anza*, III, 18, 332; IV, 44.

5: Castetter & Bell N-5 (1938-1940) 1942
NU28 Papago NU28
Pima NU29

gan by Charles R. Steen, Ranger. Jones[113] reported that these pipes (as well as others taken from a ceremonial cave on Camelback Mountain near Phoenix) were made of reed grass *(Phragmites communis)*. The pipes from Casa Grande were wrapped with cotton cloth, and both lots were stuffed with leaves of creosote bush as well as broken tobacco leaves. Jones is of the opinion that these are probably leaves of *N. attenuata*. In this same connection it is interesting to note that Fewkes[114] found large numbers of "cane cigarettes" in various rooms at the Casa Grande ruin as well as in caves near Superstition Mountain to the north of the ruin. Of special interest is the fact that he found a small dish of *N. attenuata* in one of the ruins at Casa Grande.

It is our firm belief that neither Papago nor Pima cultivated any kind of tobacco aboriginally, a situation in agreement with that for the Maricopa[115] who were adjacent to the Pima on the Gila, but that they did smoke the wild *N. trigonophylla* and *N. attenuata*.

Martynia

Pima and Papago anciently utilized the pods of devil's claw or unicorn plant *(Martynia louisiana)* in basketry. Although informants asserted that the Pimans cultivated this plant a very long time ago it is impossible to establish this definitely. It is possible that aboriginally they utilized only wild plants of *Martynia*, and that its cultivation came with the commercial stimulus to increased production of baskets.

There were two kinds of devil's claw—a black-seeded variety which grew wild, and a cultivated form with longer pods and white seeds, the longer strips of epidermal tissue being more suitable for making baskets. The white-seeded variety never grew wild but often appeared as a volunteer in cultivated fields.

[113] Jones, *Ceremonial Cigarettes*.
[114] Fewkes, *Casa Grande*, pp. 148-49.
[115] Spier, *loc. cit.*

5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NU28
Pima NU29

Dyeing

Pi Pa 386 824 Cotton was dyed buff by dipping in a dark buff ocher high in ferric oxide, but this was used only for the selvage thread. Cotton fiber dipped into a decoction made from the roots of curly dock *(Rumex crispus)*, an introduced species, as well as other species of this genus, took on a yellow color, and these roots were said to yield a darker color when the plant was in flower. Informants said roots of the native *cañaigre (Rumex hymenosepalus)*, from which all dirt had been removed, were crushed, then boiled to yield a yellowish dye solution for cotton. Fresh mesquite gum was boiled with this dye to make it fast.

Gourds

Time and Method of Harvest and Storage

Pi Pa [462] 249 Pima and Papago made a single planting of gourds. Ordinarily it was man's task to plant, but woman's to cultivate, carry water for them if necessary and harvest gourds when ripe, although men might assist in any of these stages. This single planting was made by both peoples—by the Pima in late March or early April, the Papago in July. A little more than three months was required for them to ripen.

Gourds were all gathered at once rather than progressively, and this while the plants were still green. Women gathered and carried them to the dwelling in a burden basket or cloth, cutting each one off the vine with a sharp stone. Care had to be exercised in handling them until dried lest they become bruised. When harvested, they were laid away to dry throughly before being prepared for use, usually being placed in a pile and covered with weeds or grass. They were selected by shape according to the purpose for which they were to be utilized.

There was no selection of seed from specific shapes of gourd to propagate particular types, although formerly it was customary to bind a piece of bark or cloth around them while growing in order to secure certain shapes.

5: Castetter & Bell N-5 (1938-1940) 1942
NU28 Papago NU28
Pima NU29

Preparation for Use as Vessels and Rattles

Gourds were prepared for use as follows: First they were Pi Pa 415 dried thoroughly, otherwise decay would occur in the process of preparation. The bitterness was drawn out by filling with water through an opening cut at the stem end, then allowing it to stand for three days so that the fleshy interior might decay. Most of the pulp was removed by working with a stick, then the gourd refilled and again allowed to stand for three days, after which as much of the remaining pulp as possible was scraped out. This process was repeated as often as necessary, or until the vessel ceased to impart any taste of bitterness to the water allowed to stand in it. Finally, the vessel was thoroughly rinsed with water several times and was ready for use.

Sometimes gourds which had been prepared as above were baked in live embers for two or three days to harden the shell, as this made them more durable when used as containers. It also gave them a glossy appearance since the outer surface peeled off.

Gourds or their seeds were never eaten. They were used Pi Pa 415 for canteens, dippers, containers, storage vessels, ceremonial 534 rattles and masks. For storing seeds, the hole made at the end of the neck was plugged with a stick. To prepare a gourd for use as a rattle the end of the neck was cut off, then cleaned as described above, and the gourd partly filled with pebbles taken from an ant hill. A wooden handle was fitted into the opening and secured with the gummy secretion of creosote bush or arrowweed. Gourds to be used as dippers or dishes were cut lengthwise by making a continuous row of holes with an awl the whole length of the fruit, then snapping it in two.

DEVIL'S CLAW

A single sowing of Devil's claw, or unicorn plant (*Martynia louisiana*), was made by both Papago and Pima, after sahuaro Pi Pa 249 harvest, and the pods gathered before frost. This was woman's [462]

5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NU28
Pima NU29

work, as was the cultivation and harvesting. Plants were quite drought resistant.

Only the white-seeded form was grown, as its pods had longer, finer-grained and deeper black strips of epidermal tissue, and therefore more suitable for use in basketry. They were planted in hills about six feet apart with four or five seeds to the hill, in holes about six inches deep, although the seeds were covered to a depth of only two inches.

Pods were gathered as they matured, about the time maize was ripening, but all must be gathered before frost to prevent the black color of the pod from fading. Fruits were ready to harvest when the dry epidermis peeled off readily. The ripe pods were gathered and laid out in piles in the field to dry, and informants said they had seen their mothers spread wood ashes over such piles. When thoroughly dry the pods were hooked together to form large clumps or balls, and stored in a rain-proof building, since weathering affected their color.

Before removing the strips of epidermis for use in basketry, the pods were buried in moistened ground over night to facilitate the stripping. However, more recently some merely plunge the pods in boiling water to aid in removing this tissue. These strips were tied in bundles and stored in baskets or ollas. The process of preparing and utilizing *Martynia* in basketry has been discussed in detail by Kissell.[37]

Seeds of the unicorn plant were sometimes eaten but were of little importance as food. They were removed from the pods at the time the strands of epidermis were stripped, and were dried and stored in a small sealed olla.

Wheat

Time of Harvest

Pima and Papago planted wheat any time from November to February, and harvested in May or early June. However, late sowings usually produced small plants and a poor yield.

37 Kissell, *Basketry of the Papago and Pima*, p. 302.

5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NU28
Pima NU29

Chapter IX

CULTIVATION AND UTILIZATION OF TOBACCO —A CEREMONIAL CROP[1]

Pi
Pa 276 249 889

The growing of tobacco must be looked upon as ceremonial agriculture, and the smoking of it as an essentially ceremonial practice. It is, therefore, impossible to understand the cultivation of tobacco without taking this ritualistic aspect into consideration, and for this reason it is here considered apart from the growing of other crops.

Among both Papago and Pima, tobacco was regularly grown only by old, rather than young, men although any man had the presumptive right to grow it if he knew its culture and the song. There were two reasons for this limitation to old men—first, a man ordinarily had to be fully grown before he could use tobacco, second, having less to do, the old men had time to grow it.

The Traditional Origin of Tobacco

Pi
Pa 973

Bernabé López[2] gave the following account of the origin of tobacco:

There was once an old woman who had a grandson and she told him that when she died he should take her out where the ground was soft, fertile, and where the water came down, and bury her, but not to let anyone see where he had buried her. He should then go back to the burial spot at the end of four days and he would see a small plant coming up on her grave. This he did, and again visited the spot at the end of another four days and found the plant had grown to a nice

[1] For the botanical aspects of Piman tobacco see Chaper IV.

[2] Bernabé López pointed out that his account of the origin, cultivation and smoking of tobacco applied to San Pedro and Coyote Papago villages, and that if we should get accounts from informants at other villages these would be slightly different in certain respects. Informants in general agreed that such inter-village differences existed.

5: Castetter & Bell N-5 (1938-1940) 1942
NU28 Papago NU28
Pima NU29

large one. He broke off one leaf and made a cigarette, which he smoked, and thought his mind was clearer after smoking it.

López said tobacco is like a person. After people had used it for a long time, some of them said it was no good, so Tobacco became angry and disappeared, hence people could no longer smoke. She went to the west and the people did not know just where she had gone but they began looking everywhere and finally a man found her. He came back and told the people about it, then went back and tried to persuade her to return. She refused, but did give him one seed pod of tobacco, which he brought back and planted, thus starting it again, and it turned out to be the same kind of tobacco that had originally come up where the old woman was buried, namely "under-the-creosote-bush tobacco" *(N. Tabacum)*. (Another informant said tobacco was not a woman but a man.)

This account of the origin of tobacco is essentially the same as that given by other Papago and Pima informants. Russell's brief account of the myth, as well as that of Densmore,[8] is similar in essence.

Practical Aspects of Tobacco Cultivation

The Papago always planted their tobacco in a desert wash where the soil was silty, never among other crops in their fields, and took very good care of it. The patch might vary in size from eight feet to eight yards square, and this held true for the Pima as well. The Papago method in some villages was to dig ten to twelve holes, each about eighteen inches in diameter and eight inches deep, place seed in the holes and cover with about one-half inch of soil, leaving a depression. (In one village it was customary to fill the holes with fine silt sifted through the hands.) Only two seeds (one informant said four) were placed in each hole, as otherwise the plants became too crowded and produced small leaves. In the village of one informant it was customary to loosen

[8] Russell, *Pima*, pp. 224, 248; Densmore, *Papago Music*, pp. 29-30.

5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NU28
Pima NU29

Pa 249 the soil of the entire plot with a planting stick, after which the tobacco seed was placed on the palm of the hand and blown over the plot, and the seed then covered by brushing the ground with a branch of creosote bush.

Pi Pa 249 Among the Pima, tobacco was always grown on irrigated land just like any other crop, preferably in sandy loam, never in saline soil as it would not do well. The ground was first loosened with the digging stick, then leveled. Tobacco seed was planted by an old Pima man holding it in the palm of his hand, placing the tongue in contact with a portion and more or less spitting or blowing it over the soil. Another man followed and covered the seed by brushing the soil with a branch of saltbush (*Atriplex*).

The Papago said that, unlike other crops, tobacco was planted "in the month when the weather begins to warm up," or late March to early April in our calendar; the Pima planted it when the mesquite trees began to leaf, which corresponded with late March to late April. Both tribes made but one planting. Germination was said to require four days (undoubtedly a reflection of their ritual number of four).

Pima tobacco was irrigated from a ditch like other crops; holes at each corner of the field, and a brush barrier at the point where the ditch entered the field, trapped any debris brought in by the water. Papago plants, however, were never artificially watered, dependence being entirely on rainfall and resulting flood water.

Pima and Papago plants were not thinned out as they were too precious for this; nor were they ever transplanted. Pima tobacco was hoed, but not cultivated as much as other crops, and then only shallowly, since it had not been planted deeply. Weeds were either pulled out or cut off at the level of the ground with a knife about eight inches long, made of mesquite or ironwood, charred somewhat in a fire and sharpened on both edges with a stone. (It must here be remembered that the growing of tobacco was not aboriginal.) Weeding was done once or twice during the growing season. The

5: Castetter & Bell N-5 (1938-1940) 1942
NU28 Papago NU29
Pima NU29

Papago did not hoe their tobacco, although in one village it was said to be a customary procedure. However, each time the grower visited his patch, he removed the protecting branches, loosened the dirt and hilled it around the plants by hand before replacing the branches.

It was the common Papago practice to keep animals out by building a fence around the patch, usually of creosote bush or mesquite posts, with thorny cholla cactus between, although in one village we visited the spot was not enclosed. The Pima never specifically fenced their tobacco, but if the plot were in the corner of a field planted to another crop, the entire field might be fenced. When Papago plants had come up, creosote bush branches were stuck in the ground around them for protection and shading, but when the young plants were partly grown the branches were removed. As nearly as could be determined this tobacco was called "under-the-creosote-bush tobacco" because it was always grown in a place where creosote bush was abundant; it was not planted in ashes by either Papago or Pima, as was done by some tribes. The same plot was used by the Papago for growing tobacco year after year, as long as it did well there. When it ceased to do so a new plot was selected. Pima practice was the reverse, for tobacco was rotated. Manuel Lowe said no volunteer plants came up, but this would be unusual if *N. rustica* were always the species grown. The soil was never fertilized by either people.

Both Papago and Pima knew that leaves on the plant were mature when they began to turn yellow or brown, and picked them progressively as they ripened. Among the Papago, the first leaves ripened and were gathered before sahuaro harvest, and the rest would be left until after the sahuaro season. Pima tobacco required about ten weeks to produce the first mature leaves, and the patch as a whole was not harvested until after the sahuaro fruit was gathered. Leaves of the first picking were larger, but not of better quality, than those of later ones. The mature leaves were

5: Castetter & Bell N-5 (1938-1940) 1942
NU28 Papago NU28
Pima NU29

naked plants were placed on top of the house, never thrown away or burned, for tobacco was regarded as a man. When time came for making "wine" from sahuaro fruit, these stems were placed on top of dead ashes on the ground and the wine pots set upon them. Finally the stems were disposed of by burying in a pile of ashes.

After the Papago had gathered all leaves from the plants, a number of pods were gathered for seed, leaving the stalks standing. Pods were dried in an olla and stored in a gourd, sealed with mud mixed with "sticky grass," and kept in the house; or the seed might be stored in a hole in a giant cactus made by the red-shafted flicker. The Papago did not select their tobacco seed, because they usually needed to gather all available. But among the Pima, seed was selected from those plants which were tallest and had the largest pods. Late seed might also be gathered, but if so it was planted by itself because it did not do as well. The seed was cleaned and placed in a gourd, which was sealed with the gummy secretion from the creosote bush, then stored in the ground. Occasionally, however, among these Pima whole plants bearing seed pods were pulled up, dried and hung up indoors, this constituting the seed supply. Tobacco seed was considered by both tribes as very valuable and sometimes given as gifts.

Ritualistic Aspects of Tobacco Cultivation

Unlike some tribes, neither Papago nor Pima considered that other crops grown with tobacco would be injured. However, the Papago never grew tobacco in their fields, for it must be grown in secret and a man must be in the right spirit when planting. One who planted it must not let anyone see him do so, and, when visiting his tobacco patch which was out of sight of all the other fields, took a circuitous route so that no one would suspect or learn where he was going. If someone discovered the patch and saw the young plants, they would dry up. After plants were grown there was no objection to others seeing them, as no damage could result.

5: Castetter & Bell N-5 (1938-1940 1942
NU28 Papago NU28
Pima NU29

Pi Pa 249 Also, if one should see a person planting, and knew he was planting tobacco seed, it would not come up. If a man who had ill thoughts came near the tobacco it might not come up, or if it did would not be any good.

The Pima practice differed somewhat. They, too, grew tobacco in an isolated portion of a field where no one else would see it, and for the same reason, but a man could never do the planting by himself. He must always have one or more old men accompany and help him, or at least watch him plant it. The men who assisted were paid in tobacco which the grower had previously raised. The same man did not plant tobacco every year, since he raised enough in one year for two or more years' supply. Several old men worked together to harvest the crop just as they did in planting it.

Pi Pa 249 824 Papago and Pima tobacco had to be planted by older men who knew how to "talk" to it when planting, since it was regarded as a person, saying about as follows: "Now I place you here; may you come up well, grow strong and ripen so that my friends will come here and use you," or "I am a tobacco man and I plant you." The Papago planter then sang the tobacco planting song four times and finally placed the seed in the ground. Each time he came back to see the plants, at required intervals of four days, he sang the same song to the tobacco four times, believing that this gave it more strength (four is the ritual number among both the Papago and the Pima). After the eighth obligatory visit, he need no longer sing the song unless he wished to do so.

Pi Pa [241] 249 Piman women were not allowed to see tobacco growing, and if a menstruating woman were to see the plants they would shrivel up. In planting, tobacco seed must not be called by its real name, else it would not come up, and plants should not be watched too much while growing lest they be dwarfed. All ritualistic aspects of tobacco cultivation were regarded fully as necessary as the practical ones in producing a crop.

CUCURBITS

244
[262] **Pumpkin, *hahri (Cucurbita pepo)***
Cushaw, Crookneck pumpkin, *caskatc'ki (Cucurbita moschata)*
Muskmelon, *uuwi hahri (Cucumis melo)*
Watermelon, *kihpi (Citrullus citrullus)*

Both *Cucurbita pepo* and *C. moschata* are commonly regarded as aboriginal species among the Papagos, although this has not been definitely established. The Spanish records refer to the Pima-Papago people as growing *calabasas* (10, 18), a word which was used quite loosely in old Spanish writings to denote pumpkins, squashes, or melons. Mange (18), in 1697, spoke of *melones* (probably muskmelons) and *sandias* (watermelons) as growing on the Gila and it is quite possible that these were grown from seed given by Kino, since this was ten years after his arrival. Other authorities state that watermelons were given the Indians by the Spaniards (27). Pumpkins were planted in the rainy season with an invocation like corn. When harvested [251] the rind was peeled off in a long spiral which was hung from the house roof to dry, after which it was tied into bundles and stored in jars. Muskmelons and watermelons are grown at only a few places, such as San Xavier, where there is plenty of water. No attempt is made to store them.

TOBACCO

[276]
248
Coyote tobacco, *wiupuri-(Nicotiana trigonophylla)*
Yaqui tobacco, *wiiw (Nicotiana tabacum)*

The first species used was the native *Nicotiana trigonophylla*, which grows wild on Elder Brother's mountain and is still used to some extent. In addition to this the Papagos and Pimas, at least fifty years ago, were cultivating the common tobacco *(N. tabacum)*. Seeds of this Yaqui tobacco, as the Papagos called it, were probably traded from Mexico. These seeds, in the possession of old men who did [431 435] the tobacco raising, were considered very valuable and sometimes given as gifts.

17:Castetter & Underhill N.E-5 (1931-1934) 1935
NU28 Papago NU28

Tobacco was planted in March and the planter would choose a place at the mouth of a small wash, out of sight of all the other fields, for tobacco had to be grown in secret. As soon as the plants were up creosote bush branches *(Covillea glutinosa)* were stuck in the ground to shade them. No one but the planter must now visit the patch or the plants would become shy and sink into the earth again. If a menstruating woman were to see them they would shrivel up and die.

No hoeing or transplanting was done but merely earth heaped around the roots now and then. A fence of mesquite posts *(Prosopis veluntina)* with thorny cholla cactus *(Opuntia* sp.) between protected them from marauding animals, and a ditch dug from the wash to the patch conducted any possible rain water. The creosote bush shelter was left until the plants grew up and touched it. When the tobacco was ripe the leaves were pinched off and spread on a mat outside the house to dry, although they were considered ready for smoking when about half dried, still green and very bitter.

COTTON

Cotton, *to'ki* *(Gossypium* sp.)

The early Spanish accounts refer to cotton as being grown, not only by the Gila Pimas (10), but by the Sobaipuris on the San Pedro (27) and by the people of San Xavier (10) (who were not the present residents). Little mention is made of the growing of cotton by the desert people, but informants thought a little was grown in favored places. No particulars of its culture were obtained. Cottonseed flour made very good browned cakes when baked on hot sand.

WHEAT

Wheat, *pi:rkanyi* *(Triticum aestivum)*

Wheat seeds were given away profusely by Kino at the end of the seventeenth century. Most Papagos, however, say they did not take over its general use until two or three